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Two new species of the genus *Discoelius* Latreille (Hymenoptera, Vespidae, Eumeninae) from China, with a key to the Chinese species

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Abstract

Two new species, namely *Discoelius nigriclypeus* Zhou & Li, **sp. n.** from Hunan, China, and *Discoelius emeishanensus* Zhou & Li, **sp. n.** from Sichuan, China, are described. A key to the Chinese species of the genus is provided, along with illustrations of the new species. Type specimens of these two new species are deposited in the Institute of Entomology and Molecular Biology, Chongqing Normal University.

Keywords

Hymenoptera, Vespidae, Eumeninae, *Discoelius*, new species, China

Introduction

The eumenine wasp genus *Discoelius* was established by Latreille (1809). The members of the genus are solitary wasps that are easily distinguished from other genera occurring in China by the presence of two spurs on the mid tibia and the petiolate metasomal

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segments 1 and 2. *Discoelius* is similar to *Zethus* Fabricius (just one species, *Zethus dolosus* Bingham, 1897 recorded from China according to Li 1985), but the latter has a longer petiolate metasomal segment 2 and the valvula prominent beneath the submarginal carina, usually quadrate in shape. Presently, seven species and one subspecies are recongnized worldwide, of which *D. dufourii dufourii* Lepeletier, *D. d. manchurianus* Yasumatsu and *D. pictus* Kostylev are from the Palearctic Region, *D. esakii* Yasumatsu, *D. longinodus* Yamane, *D. turneri* (Meade-Waldo) and *D. wangi* Yamane from the Oriental Region, while *D. zonalis* (Panzer) is known from both the Palearctic and Oriental Regions (Meade-Waldo 1910; Yasumatsu 1934; Kostylev 1940; Giordani Soika 1971; van der Vecht and Fischer 1972; Li 1982, 1985; van der Vecht and Carpenter 1990; Yamane 1990, 1996; Gusenleitner 1999; Kim 2005). Five species and one subspecies have been recorded from China, of which *D. dufourii dufourii* Lepeletier and *D. d. manchurianus* Yasumatsu occur in the north of China (Kim 2005); *D. zonalis* (Panzer) occurs in the south of China (Li 1985; Kim 2005), and *D. esakii* Yasumatsu, *D. longinodus* Yamane and *D. wangi* Yamane in Taiwan (Yamane 1996). In the study of Chinese *Discoelius*, we found two species that are new to science. In the present paper, we describe these two new species, and provide a key to the Chinese *Discoelius* species.

Materials and methods

The examined specimens are deposited in the Institute of Entomology and Molecular Biology, Chongqing Normal University, Chongqing, China (CQNU), the Entomological Museum, China Agricultural University, Beijing, China (CAU), Yunnan Agricultural University, Kunming, Yunnan (YNAU), Central South Forestry University, ChangSha, Hunan (CSCS) and Guangxi Normal University, Guilin, Gungxi (GXNU). Morphological terminology follows Bohart and Stange (1965), Carpenter and Cumming (1985) and Yamane (1990). All measurements were taken as the maximal length of body parts measured under an image analyzer (Nikon SMZ1500), figured with the aid of a stereomicroscope (Olympus SZX7). Body length was measured from the anterior margin of head to the posterior margin of metasomal tergum 2.

Taxonomy

Genus *Discoelius* Latreille

http://species-id.net/wiki/Discoelius

Discoelius Latreille, 1809: 140; Saussure 1852: 24; Yasumatsu 1934: 3; Vecht and Fischer 1972: 2; Li 1985: 80; Carpenter 1986: 68; Vecht and Carpenter 1990: 19; Yamane 1990: 22; Yamane 1996: 111; Kim 2005: 111.

Type species. *Vespa zonalis* Panzer, 1801.

Diagnosis. Mandible short: not distinctly crossing each other, just a small apical portion overlapping. Clypeus transverse, with widely rounded or somewhat truncate apical margin. Antennal scape somewhat depressed in both sexes. Vertex and gena more or less convex. Mesoscutum with notaulices for its whole length. Metasomal segment 1 less than half as broad as segment 2; both terga 1 and 2 petiolate. Mid tibia with two apical spurs (Kim 2005).

Distribution. China (Hebei, Zhejiang, Jiangxi, Sichuan, Chongqing, Fujian, Guangxi, Yunnan, Hunan, Liaoning, Shaanxi, Guangdong, Beijing, Inner Mongolia, Taiwan); Palaearctic and Oriental regions.

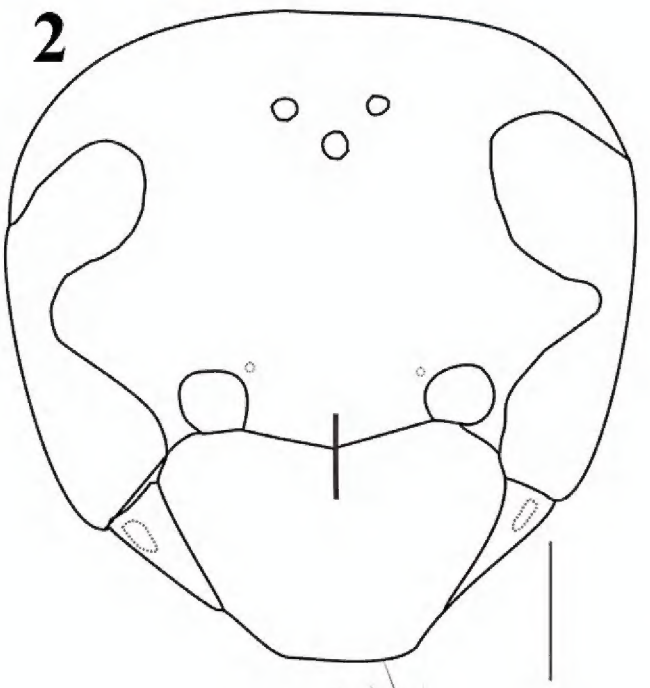
***Discoelius nigriclypeus* Zhou & Li, sp. n.**
urn:lsid:zoobank.org:act:8AB3F0A2-C506-45CD-82EF-4B1CD47472B4
http://species-id.net/wiki/Discoelius_nigriclypeus
Figs 1–4

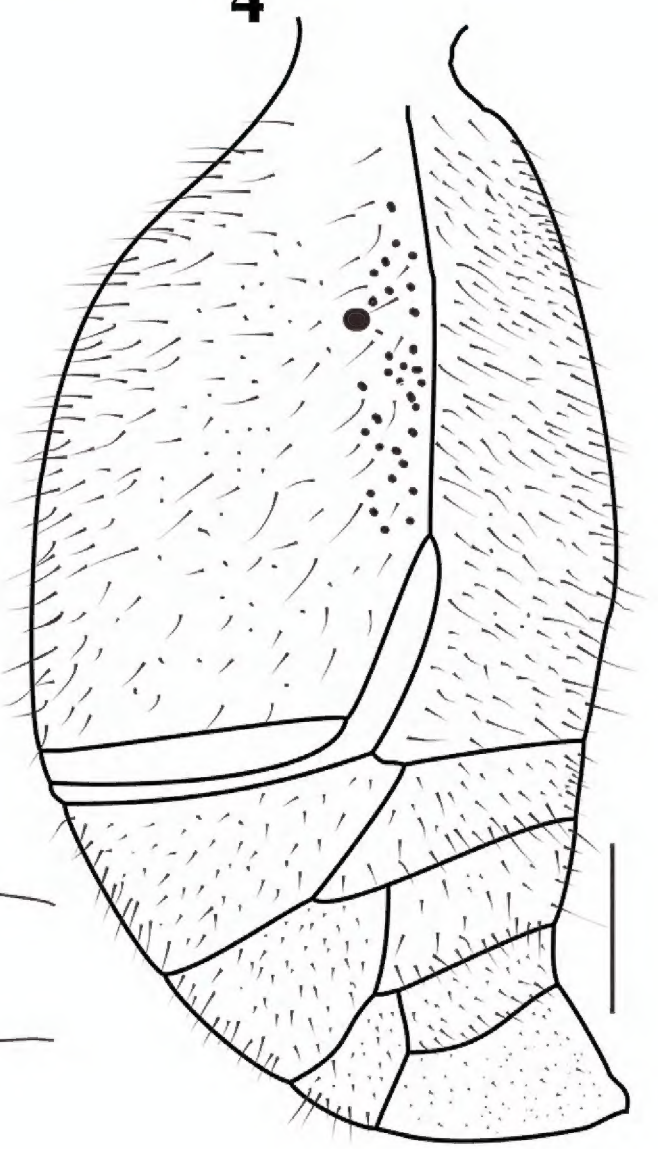
Material examined. Holotype, ♀, China, Hunan Prov., Changde City, Shimen County, Fuping mountain, 29°42'51"N, 110°45'21"E, 1200–1600 m, 9.VI.2004, Yang Jiang (CQNU).

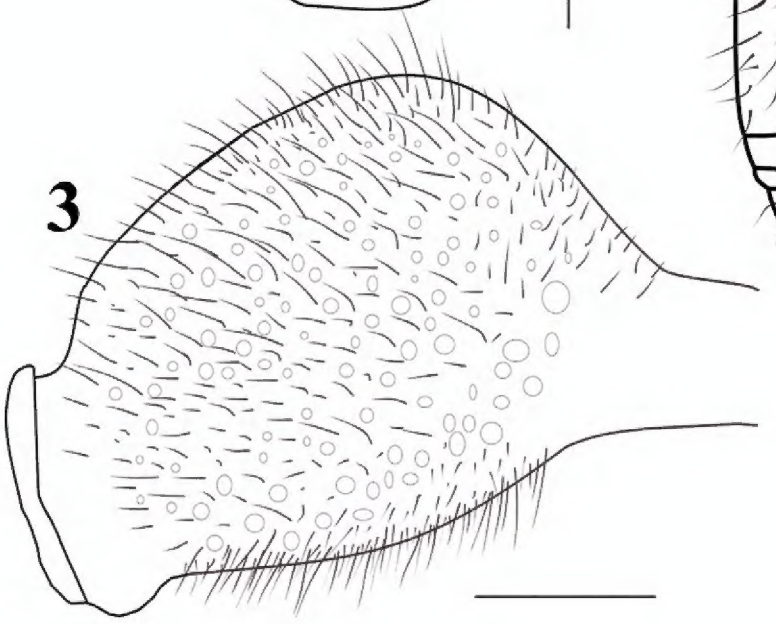
Description. Female, body length 18.0 mm, forewing length 15.0 mm. Black, with the following parts yellow or orange yellow: a spot on mandibular base, a very small spot just above antennal socket (Fig. 2), narrow apical bands on metasomal terga 1-2 (Figs 1, 4); the base of mid femur with a very small deep yellow line.

Head: flat and subcircular, covered densely with punctures and sparsely with brownish setae; mandible stout, not long, outer surface with two longitudinal carinae developed, between them with a short one, inner margin with two wide teeth; width of clypeus as long as length, not distinctly convex, irregularly punctuate and with strong punctures, emarginate basally and apical margin truncate; frons sparsely with short brownish setae and a strong vertical carina just above the clypeus, the carina distinct on the upper about one-fourth of clypeus (Fig. 2); antenna very short, scape and pedicel of antenna shining, densely with minute punctures, flagellum dull and with microscopic punctures, the length of flagellum 1 about 1.5 times flagellum 2, flagellums 2-8 wider than length, respectively, and the width about 1.2 times the length; in profile, gena very broad and sparsely with punctures and short erect setae; postgena densely with long setae.

Mesosoma: From above, length about 2–3 × width; mesoscutum and scutellum flat and in single plane; mesoscutum and scutellum densely with longitudinal carinae, the interspaces between the carinae with very minute punctures; mesoscutum with developed notaulices, between the notaulices shining apically, not punctate and without carina; scutellum and metanotum sparsely punctate, with strong punctures; propodeum reticulate, not shining, with lateral carina and dense long brownish erct setae; the setae on mid tibia denser than those on femur and the tibia widening from base, the apical width about 4 times basal width; the length of mid tarsal 1:2:3:4 ≈ 10:2:1:1, and ≈ 16:4:3:2 in hind tarsus.







Figures 1–4. *Discoelius nigriclypeus* Zhou and Li, sp. n. ♀. **1** general habitus (lateral view) **2** frons and clypeus **3** metasomal segment 1 (lateral view) **4** metasomal segments 2-6 (lateral view). Scale bar: 1mm.

Metasoma: In profile, anterior slope of metasomal tergum 1 steep, and tergum covered wholly with brownish erect setae and punctures, the setae on ventral-lateral part denser and longer than those on dorsum, the interspaces between punctures as large as punctures, the preapical furrow deep (Fig. 3); segment 2 with more sparser, smaller and shallower punctures, the interspaces between the punctures 3-4 times punctures, basally with one smooth area and apical lamella very narrow (Fig. 4); the punctures on metasomal terga and sterna 3–6 smaller and denser than those on tergum 2, setae shorter than those on tergum 2; the apical margin almost truncated in terminal metasoma.

Male. Unknown.

Remarks. This species can be distinguished from the similar *D. zonalis* (Panzer, 1801) and other members of the genus by the combination of the following characters: more strongly punctate body, length of mesosoma about 2–3 times width, mesoscutum and scutellum flat, clypeus entirely black and emarginate basally, not distinct convex, postgena densely with long setae, mesoscutum apically between developed notaulices shining and not punctate, metasomal tergum 2 basally with one smooth area and apically with narrow lamella.

Distribution. China (Hunan).

Etymology. The specific name *nigriclypeus* is the Latin *nigr-* (= black) + *clypeus* (= clypeus), which refers to the clypeus of the species black.

***Discoelius emeishanensus* Zhou & Li, sp. n.**

urn:lsid:zoobank.org:act:D74C8DEC-5373-4DA4-B017-3ED1B3DE9F9B

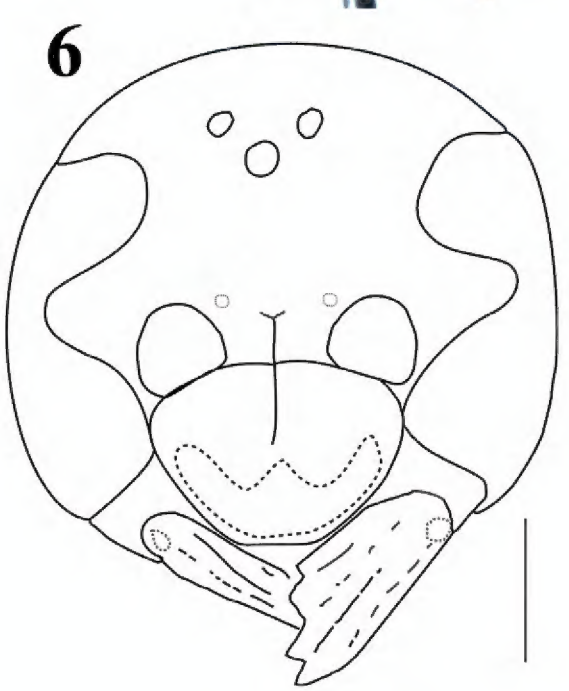
http://species-id.net/wiki/Discoelius_emeishanensus

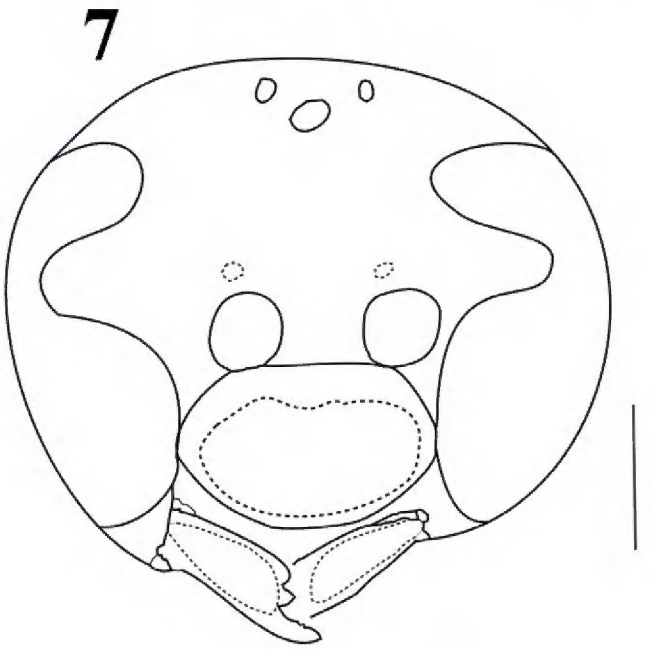
Figs 5–10

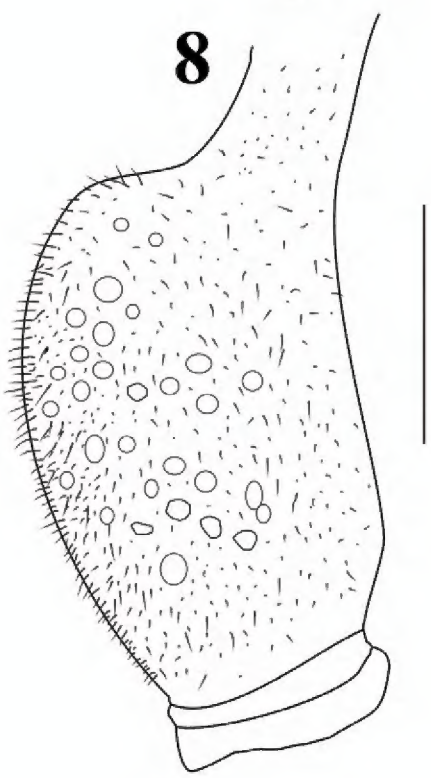
Material examined. Holotype, ♀: China, Sichuan Prov., Leshan City, Emeishan Country, Gaoqiao Town, Yanshi Village, 29°30'14"N, 103°25'35"E, 551 m, 11. VIII. 2011, Tingjing Li (CQNU). Paratype: 1♂, the same as holotype (CQNU).

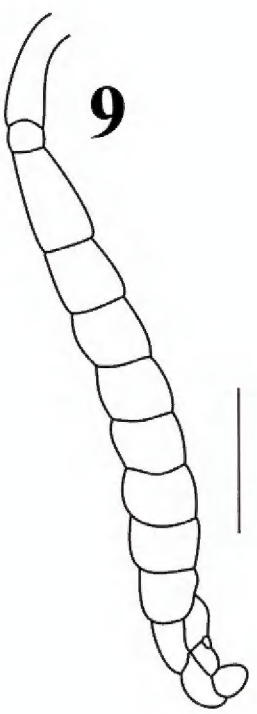
Description. Female body length 15.0 mm, forewing length 12.0 mm. Black; with the following parts yellow or orange yellow: a marking on mandibular base, apex of clypeus, a small spot just above antennal socket (Figs 6, 7), a line on the anterior face of fore tibia, narrow apical bands on terga 1–2 (Figs 5, 10); anterior face of antennal scape with a deep brownish line.

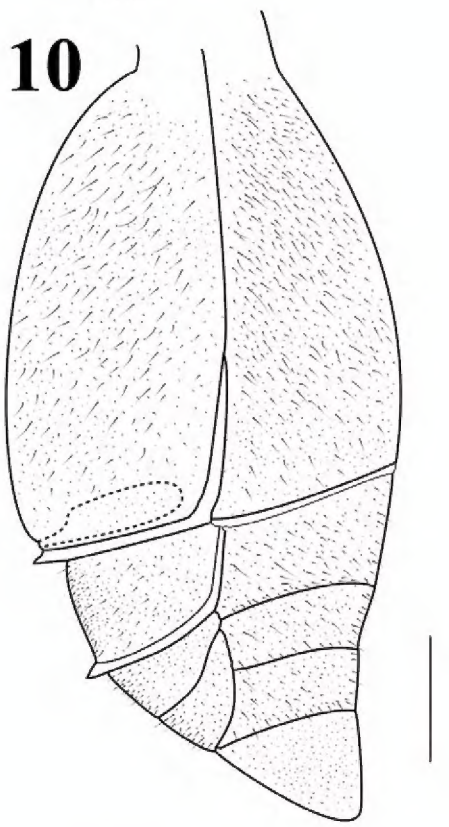
Head: In frontal view, head subcircular; punctures mostly dense and coarse; mandible stout, not long, its apex sharply pointed and slightly curved inward, inner margin with four wide teeth, outer surface with four longitudinal carinae; clypeus wider than long, with short white setae and irregular strong punctures (somewhat reticulate), its apical margin truncate (Fig. 6), in profile, not concave; frons weakly concave in the middle, one strong vertical carina just above the clypeus and the carina distinct in the upper about one-half of clypeus (Fig. 6); scape of antenna somewhat shining, densely covered with minute punctures, flagellum not shining and with microscopic punc-











Figures 5–10. *Discoelius emeishanensus* Zhou and Li, sp. n. **5** general habitus (lateral view), ♀ **6** frons and clypeus, ♀ **7** frons and clypeus, ♂ **8** metasomal segment 1 (lateral view), ♀ **9** antenna (lateral view), ♂ **10** metasomal segments 2-6 (lateral view), ♀. Scale bar: 1mm.

tures, antennal article 3 longer than article 4, articles 4-10 wider than long and apical width about 1.2 times basal width, respectively; in profile, gena very wide, gradually narrowing towards the base of mandible and the narrowest near the base of mandible.

Mesosoma: From above, length of mesosoma about 2 times its width, and the whole mesosoma with white short appressed pubescenses and coarse punctures; pronotum with one continuous ridge extending laterally to fore coxa; one weak carina between the notaulices; scutellum and metanotum strongly punctate, with longitudinal, elongate wrinkles and without median furrow; propodeum shining, with lateral carina and sparsely short setae, dorsal and posterior faces rugosely striate to reticulate, lateral face shining, without punctures and setae; the setae on the mid tibia denser than the femur and the apical width about 2 times basal ones; the mid tarsal 1 dumpy and the hind tarsal 1 slender; the length of the mid tarsal 1:2:3:4 ≈ 4:1:1:1, and ≈ 20:4:2:1 in hind tarsus.

Metasoma: Length of metasomal segment 1 more than 2 times its apical width; tergum 1 with big and sparse punctures and white short setae, in profile, the anterior slope rather steep (Fig. 8); the length of tergum 2 about 1.1 times apical width, terga 2-3 apically with developed reflexed lamellae, respectively; the other terga without apical lamellae, with weaker and sparser punctures (Fig. 10); the apical margin of terminal metasoma triangle.

Male (Figs 7, 9). Differs from the female as follows: body length 12.0 mm, forewing length 8.0 mm; mandible with three teeth, of which the apical one very long and the yellow marking bigger, almost covering the wholly outer surface of mandible; clypeus almost wholly yellow (Fig. 7); the length of antennal flagellum 1 about 1.8 times apical width and gradually widening from base; flagellum 2 about 1.2 times width and not widening from base; flagellums 3–7 as long as apical width; antennal article 13 almost black, dull and small, folded beneath (Fig. 9); outer face of fore femur with a very broad yellow line, and mid femur apically with a small yellow markings; mid tibia sparsely with short white setae, and hind tibia with long goldenish denser setae; the length of mid tarsal 1:2:3:4 ≈ 5:1:1:1, and ≈ 24:6:2:1 in hind tarsus, the length of hind tibia about 1.5 times mid tibia; in dorsal view, the length of metasomal tergum 1 about 1.2 times width and the length of tergum 2 about 0.8 times width, the setae on sterum 2 denser than those on tergum 2; terminal metasoma subcircular, punctures bigger and denser than those on tergum 2, setae shorter and sparser and apical margin brownish.

Remarks. This species can be distinguished from the similar *D. zonalis* (Panzer, 1801) and other members of the genus by the combination of the following characters: propodeum shining, sparsely with short setae; in male mandible with three teeth, of which the apical one very long, in female mandible with four teeth; scutellum and metanotum without obviously median furrow; terga 2-3 with a developed reflexed apical lamella, respectively (Fig. 10); tegula entirely black; in male, outer face of fore femur with a broad yellow line; metasomal tergum 1 with big punctures.

Distribution. China (Sichuan).

Etymology. The specific name *emeishanensus* is the Neolatin adjective, which refers to the region from which the type specimens were collected.

Key to the Chinese species of the genus *Discoelius*

1 Large species: body length more than 17.5 mm and forewing length more than 15.0 mm in female; clypeus basally distinctly emarginate; between the notaulices shining apically, not punctate and without carina; metasomal tergum 2 basally with one smooth area ..... ***D. nigriclypeus* Zhou & Li, sp. n.**

– Small species: body length less than 15.0 mm and forewing length less than 14.0 mm in female; clypeus basally indistinctly emarginate; between the notaulices usually not shining, with punctures or carina; metasomal tergum 2 basally without one smooth area **2**

2 Clypeus slightly emarginate apically; anterior slop of metasoma tergum 1 rather gentle; tergum 2 with a very narrow "neck" and entirely black (Yamane 1996) ..... ***D. longinodus* Yamane**

– Clypeus usually widely rounded or truncated apically; anterior slop of metasoma tergum 1 steep; tergum 2 without narrow "neck" and usually with yellow apical band **3**

3 Metasomal terga 2-4 with a reflex apical lamella, respectively **4**

– Metasomal terga 2-3 usually with a lamella, respectively (sometimes just tergum 2 with lamella) **5**

4 Propodeum with lateral ridges and lateral face with superficial and irregular large punctures in the upper portion; clypeus and mesosoma usually entirely black; stigma of forewing brown to dark brown (Yamane 1996) ..... ***D. wangi* Yamane**

– Propodeum without lateral ridges and lateral face weakly reticulated; usually two-third of clypeus apicaly yellow and mesosoma with rich yellow markings; stigma of forewing amber yellow (Yasumatsu 1934; Yamane 1996) ..... ***D. esakii* Yasumatsu**

5 In female, mandible with four teeth; in male, mandible with three teeth and the apical teeth very long; scutellum and metanotum without obviously median furrow; tegula usually entirely black; the punctures on the metasoma tergum 1 bigger and sparser, sternum 2 without yellow apical band; in male, outer face of fore femur with a broad yellow line ..... ***D. emeishanensus* Zhou & Li, sp. n.**

– Mandible with two or three teeth in female and three or four teeth in male, the apical teeth not long in both sexes; scutellum and metanotum with median furrow; tegula usually with yellow or brownish colour; the punctures on the metasoma tergum 1 smaller and denser, sternum 2 usually with yellow apical band; in male, outer face of fore femur usually entirely black **6**

6 In frontal view, face including clypeus flattened in female; frons, clypeus, mesoscutum and scutellum densely with longitudinal carinae in the female; male antennal articles 8-10 distinctly with tyloids covering their lower faces extensively; terminal article stumpy, in profile slightly longer than breadth, and obliquely truncated on apical margin (Kim, 2005) 7

– In frontal view, face including clypeus not flattened in female; frons, clypeus, mesoscutum and scutellum densely with punctures, which only partially form

carinae and reticulae, in the female; in male antennal articles 10 ventrally and apical part of article 9 with weak and small spot-like tyloids; terminal antennomere slender, in profile distinctly longer than breadth, with apical margin somewhat rounded (Kim, 2005) ..... ***D. zonalis* (Panzer)**

7 Vertex without yellow line; mesosoma black, except pronotum with a pair of yellow dots..... ***D. dufourii dufourii* Lepeletier**

– Vertex with a pair of short oblique yellow line; pronotum, tegula, mesepisternum, scutellum and metanotum with yellow markings, respectively .... ***D. d. manchurianus* Yasumatsu**

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